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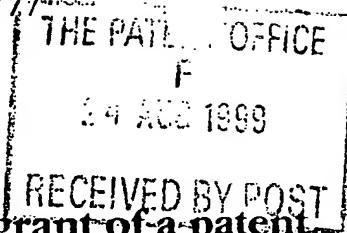
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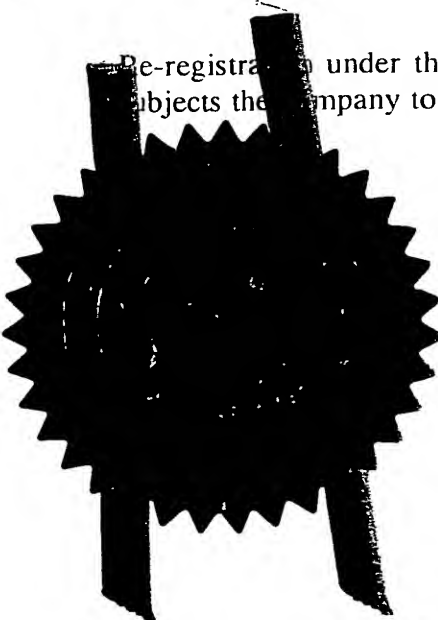
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Dated   - 6 SEP 2000

Form 1/77

The Patent Office

1/77

24AUG99 E471504-1 C54847
P01/7700 0.00 - 9919875.6

1977
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Request for grant of a patent

*(See the notes on the back of this form. You can also get
an explanatory leaflet from the Patent Office to help
you fill in this form)*

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1.	Your reference	DTL / RIMS / PT 1

2. Patent application number
(The Patent Office will fill in this part)

24 AUG 1999

9919875.6

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

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Patents ADP number *(if you know it)*

7726755 001
772676 3001

7726748001

If the applicant is a corporate body, give the country/state of its incorporation

UNITED KINGDOM.

4. Title of the invention

RIMS (Remotely Interactive Metering System)

5. Name of your agent *(if you have one)*

~~TO BE ADVISED~~

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

ANTHONY CUNDY & CO.
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Patents ADP number *(if you know it)* 00002188001

		Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*
6.	If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number			

		Number of earlier application		Date of filing *(day / month / year)*
7.	If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application			

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) *any applicant named in part 3 is not an inventor, or*

b) *there is an inventor who is not named as an applicant, or*

YES.
Form 7/77 to be sent under separate cover.

Patents Form 1/77

9. Enter the number of sheets for any of the
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Continuation sheets of this form ——

Description | |

Claim(s)

Abstract

Drawing(s)

10. If you are also filing any of the following,
    state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right
to grant of a patent (Patents Form 7/77)

Request for preliminary examination
and search (Patents Form 9/77)

Request for substantive examination
(Patents Form 10/77)

Any other documents
(please specify)

11.   I/We request the grant of a patent on the basis of this application.

Signature _B Al-Obaidy_   Date 20/8/99

12. Name and daytime telephone number of
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                                            0468 312523.

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DIGITAL TERMINOLOGY UK LTD

RIMS
REMOTELY INTERACTIVE METERING SYSTEM
SYSTEM

Version 1.

1. DOCUMENT CONTROL

1.1 SUPERSEDED DOCUMENTS

This is the first version of this document.

1.2 VERSION HISTORY

Version	Date	Comments
1.0	4th August 1999	Original

INTRODUCTION

Currently all the utilities metering, whether they are Gas, Electric or Water meters, are individual mechanical components that measure the unit consumption of each facility used. Collecting the readings for each utility is left exposed to human intervention and is liable to recording errors.

The human intervention in transporting these data has an impact on billing and reflecting the consumption pattern that has significant importance to supplier, consumer, and transporter. Errors in reading these units will result in inaccurate billing and would give the wrong impression to the utility supplier catering for that demand.

The Remotely Inter-activated Metering System addresses the meter reading, collecting system. This invention is addressing the operational concept as well as the Electro-mechanical interface of this operation.

This document is intended to protect the invention and gain a priority date whilst negotiation into the development and manufacture of these devices is taking place.

OVERVIEW

Remotely Inter-activated Metering System is composed of components, some of which can be fitted inside the meter casing. This will provide for,

- Sensing for directional rotation
- Pulse counting
- Anti-Jittering

While other components can be housed in a different casing to provide for,

- Unit counting
- Consumption Rate changes
- Communication components.

These components are all of military specifications and operational in extreme weather conditions. Also these Electro-mechanical components will **eliminate the need to use any operational battery.** The box will be sealed to operate for at least ten years.

The RIMS will utilise the customer's communication line to deliver accurately collected readings from a sector of addresses to the nearest utility 's computing site. The call will be using a free phone number, also the transmission duration and timing will be done in a way that minimises the customer's inconvenience. The call out will be done after 2:00 AM in the morning as "Economy 7" will activate the transmission circuit.

PATENTABLE ITEMS

1. Digital Decimal Odometers, they are mechanical dials, which interface to the visual dials. These digital odometers are driven by a microprocessor's micro electronic. This will enable digital reading of these dials to a register then communicating these readings to any destination.

2. Anti-Jitteriness and unidirectional revolution odometers sensing.

3. Plurality of meters per household, Gas Electric and Water, and per sector of these addresses.

4. Use of "Economy 7" radio signal for triggering consumption rate change , also to initiate transmission of these readings as required.

5. Use of Transmission Control Protocol /Internet Protocol (TCP/IP), addressing for individual metering collection Hub (MCH) or node. This will enable Networking routing and communications. A Hardware/Software switch setting point for each node can be achieved to give an individual identification address to that node.

1. DIGITAL DECIMAL ODOMETERS

The Digital Decimal Odometers are a set of wheels each of 1 millimetre in depth. Each has a set of 4 grooves of an equal length punched through its surface. The outer ring groove lengths are split into two halves, the first half runs parallel to the first inner ring groove and the second half runs alone across its sector. The length of these grooves are spread equidistantly on the surface, with one sector without grooves. Their position, however, is spread equally and distant apart, at the same intervals as the groove reader mounted on the reader arm. The width of each groove is wide enough only to allow a narrow beam of laser or light ray to penetrate. These grooves will enable that wheel to represent , digitally, figures of 0 to 9 hexadecimally.

These Digital Decimal Odometers are fixed with gears, which are attached to the counter visual dials. This arrangement will enable both the visual display of numeric counting also the representation of these decimal numbers electronically.

A reader arm, mounted with a fixed 4 digital light oscillator and situated on top of these grooves, will read the decimal representations, as the light passing through these grooves will enable the registration of a set of 0s or 1s.

The number of these wheels will match exactly the number of dials displayed on the utility display counter, i.e. if there are 9 sets of display dials on the Electricity meter, then there must be nine sets of these DDOs.

These DDOs can provide electronically the amount of units consumed instantly at any time. These mechanical devices will eliminate the need for a battery in case of power deprivation. They can be mounted inside a meter or can be driven by pulses from a microprocessor in a separate box to the meters.

2. Anti-Jitteriness and Unidirectional Sensing

This component can be mounted inside the electricity meter in order to provide the following functionality,

- Directional revolution of the rotating disk. This disk is located inside the electricity meter and it rotates freely due to magnetic fields and forces applied upon it through the set of coils mounted inside the meter. This disk will clock the amount of unit consumption of electricity. Due to the reflective silver material and the marker set on its side, a light sensor can detect its position. A combination of these sensors will detect its directional rotation.

- The sensing of rotational revolution will be confirmed only when both sensors have detected the marker located on that disk. A unit consumed will be registered only when both of these sensors have recorded the marker.

- Anti-Jitteriness sensing,

In normal operational circumstances this disk jitters when the meter is operating with hardly any load carried through, i.e. minimal consumption of electricity. The sensors will register a directional rotation only when both of them have simultaneously recorded the marker. Then one units consumption will be registered. This will prevent the false registration of multiple units consumed due to jitteriness of the disk in low load applications.

3. PLURALITY OF METERS

One feature of this invention is that the RIMS is a mechanism with the capability to read multiples of meters by using the DDOs. They can be implemented for all of the utility meters, thus providing a collection hub for these utility meters per household, also per sector of building or block of flats.

Isolating the meter readings from the communication layer will allow the use of a Muliplexer to collect the readings and store them temporarily, until the final connection between the MCH and the utility has successfully exchanged the confirmation for receiving these readings.

4. USE OF "ECONOMY 7" SIGNALLING SYSTEM

Currently, electricity suppliers encourage consumers to use electricity between the hours of midnight and 7:00 AM, this is labelled as "Economy 7" rate. The unit of electricity is charged at a much cheaper rate than that of the normal day unit. Economy 7 rate is usually operated by a signalling system that switches on another set of gears and gates in a different box to that of the meter consumption unit. This box will switch the rate-counting dials to use the nightly units' counter dials.

RIMS invention utilises this signalling system to each use outlined below.

a) Switching on the cheaper unit consumption rate.

b) Switching on a timer unit circuit to count up to a specified number of hours for the purpose of starting the communication layer for the MCP to dial the utility concern and deliver the readings.

5. USE OF TCP/IP ADDRESSING NODE FOR MCH

This feature is to give a node, that is the Plurality of meters per household and the sector meter reading collection hub, a unique address. The communication layer for this node consists of the following;

- Connection to the customer house telephone line with a dial up facility with a fixed number of tries to dial the utility computer site using a free phone number and after the "Economy 7" radio signal has triggered the transmission process off.

- The Media Access Control (MAC) address for the device will be the embedded Modem MAC address.

- The initial state of the RIMS will have TCP/IP stack loaded to its RAM from the ROM when initially switched on. The TCP/IP stack will have class C addresses initially for the trial period (prototype). Bearing in mind this network is a private one and does not have any Internet access. The IP address will be encoded by hardware or software means (via its password protected serial port). Then the IP address range could be changed to a bigger range (for instance class A) when the device is accepted and in full production;

- The system will use FTP (File Transfer Protocol) application within the TCP/IP suite to transfer the reading back to the host system database, and shut down the connection (telephone line).

- The host system will consist of Modem rack with several modems, TCP/IP stack loaded, and should be configured as FTP server with a database application running. Modification, editing and billing could be done from the database.